

wards beings more and more complicated, arrive at the very summit of the series, viz. *Amanita cæsarea*.

The various developments which the unfolding of this new subject for contemplation would allow of, would carry me beyond my object. Far from having exhausted, I have, alas ! scarcely glanced over it. I leave this to those who are more capable. I could attempt only a feeble sketch ; may it at least be sufficient to guide the reader in the midst of the numerous difficulties which await him in the study of this great and important class of the vegetable kingdom.

Paris, Feb. 1, 1841.

XXXIV.—*Observations on the Progress recently made in the Natural History of the Echinodermata.* By Prof. AGASSIZ.

[Continued from p. 197.]

IN my 'Prodromus' I expressed doubts as to the membranous ambulacral tubes in the Sea-urchins having any relation to their powers of locomotion, grounding my opinion upon some observations which I had made on the sandy shores of Normandy, and upon the very positive assertion of Aristotle, who tells us that they move by the aid of their spines ; and that even by the state of these organs their degree of progressive power may be known (liv. iv. chap. v.). Mr. Forbes, however, has shown this view of the matter to be erroneous, and has demonstrated that they also progress by means of their ambulacral tubes, especially when upon solid surfaces. In company with this gentleman I have seen them ascend, by the aid of these tubes, the perpendicular sides of a smooth glass vessel. No further evidence could be wanted to set at rest the point in question. It yet remains to be shown whether, among the *Cidarites*, the long club-shaped spines are not the principal organs of motion, and that it is among the Sea-urchins with very short bristles that the ambulacral tubes are essential to this function. M. de Siebold mentions the existence of microscopic cilia in the interior of these tentacula and of their vesicles (Mül. Archiv, 1836, p. 295). M. Ehrenberg, on the other hand, describes the vibratory movements in the membrane of the spines of *Echinus saxatilis* (movements which are denied by Mr. Forbes), and indicates the existence of an internal circulation of corpuscles, similar to the globules of blood, in the retractile tentacula upon the dorsal face of the *Asterias violacea* ; he adds, moreover, that the surface of these tentacula is entirely covered with vibratile cilia (Mül. Archiv, 1834, p. 577). M. Volkmann has also given some new details upon the circulation in the *Asteriæ*,

but I am only acquainted with his researches from extracts (Wiegmann. Archiv, 1838, vol. ii. p. 333).

The history of the development of the *Echinodermata* is enriched with many important facts. M. Sars has made known the changes which the *Asterias sanguinolenta* of Müller undergoes during the early stages of its existence.

Mr. Thompson of Cork, twelve years after having described his *Pentacrinus europæus*, published a second memoir on this animal, in which he regards it as the young state of the *Comatula rosacea*. This opinion has been fully confirmed by Messrs. Forbes, Thompson of Belfast, and Ball, who have seen the living *Pentacrinus europæus* detach itself from its stalk, and swim freely in the form of a small *Comatula*. The information given by Mr. Forbes regarding the development of this *Comatula* is highly curious.

M. de Siebold has indicated the existence of the vesicle and the germinal spot in all the *Asteriæ* which he examined (Müll. Archiv, 1836, p. 297). M. J. Müller has also described the vesicle and germinal spot of the *Comatulæ* and *Ophiuræ*. M. Peters (Müll. Archiv, 1840, p. 143) announces that the Sea-urchins have the sexes distinct. They do not differ externally it is true; the sexual organs in both males and females have the same appearance; but in the females of *Echinus purpureus* and *E. Melo* the sexual glands are red, and contain ova where the *vitellus* and germinal vesicle are to be distinguished, whilst in the males these are white, and only filled with spermatozoa. MM. Valentin and R. Wagner have likewise noticed a distinction of sexes amongst the *Holothuriæ*, and M. Rathke among the *Asteriæ*. M. J. Müller, moreover, observes that it is probably the same in the *Crinoidæ*, or at least in the *Comatulæ* (Müll. Archiv, 1840, p. 144). MM. Valentin and Miescher have observed spermatozoa in the *Spatangus purpureus* (Repert. de Valentin, 1840, p. 301). M. Milne Edwards has confirmed these facts by additional observations.

In a special memoir inserted in Wiegmann. Archiv. for 1837 (vol. i. p. 241), M. Philippi has described two monstrosities in the genera *Echinus* and *Spatangus*. MM. H. de Meyer and Agassiz have also made known various monstrosities depending both upon deficiency and excess.

Many lengthy memoirs have appeared upon the fossil *Echinodermata*, and a large number of species will be found described in a variety of general works upon geology and palæontology. But these works are wanting still in agreement, most of the authors differing in opinion as to the limits which should be assigned to genera. The genera which have been

established subsequently to those of Miller among the *Crinoideæ*, and which are very numerous, would appear especially to call for revision. M. Alcide d'Orbigny has just undertaken this difficult task, in publishing his '*Histoire naturelle des Crinoïdes vivans et fossiles*,' a work which is based upon the critical examination of a very extensive collection of specimens. It appears to me that the great merit of this monograph consists in the systematic arrangement of the genera, which are here distributed into natural families, whilst before we had them disposed without any method, but just as some might happen to follow upon others (*pêle-mêle à la suite les uns des autres*). Three parts of this interesting work have already appeared, which contain descriptions of the genera *Guettardicrinus*, *Apiocrinus*, and *Millericrinus*, of the family *Apiocrinoideæ*. It is only to be regretted that M. d'Orbigny was not aware of the labours of M. Ch. König, who, in his '*Icones sectiles*,' had long since established many genera, of which his *Ceriocrinus*, *Pomotocrinus*, and *Symphytocrinus* appear to me synonymous with those proposed by M. d'Orbigny. M. L. de Buch has also published, in the *Bulletins* of the Berlin Academy, a critical investigation of the *Sphæronites*, a group of *Crinoideæ* but little known, and whose structure had escaped the observation of his predecessors. This memoir is accompanied with beautiful figures. Pander has also given, in his '*Beyträge zur Geognosie des Russischen Reichs*,' some information upon these fossils, accompanied with figures. Count Munster, in a special memoir upon the fossil *Crinoideæ*, inserted in the '*Acta nova Academ. Cæsar. Leop. Carol. Naturæ Curiosorum*,' t. xix. &c., has made known a new genus under the name *Gasterocoma*, and has given excellent figures and admirable descriptions of a large number of species which had not been published in his great work on the fossils of Germany. In his '*Beyträge zur Petrefactenkunde*,' Count Munster has also described many new *Crinoideæ* of the transition period, among which are three new genera very remarkable for the disposition of the parts of the cup (*calice*), which, deviating from the quinary type so general in this group of animals, present numbers not found in the class *Echinodermata*. He calls these genera *Diocrinus*, *Triacrinus*, and *Asterocrinus*. Count Munster has moreover, in the same work, established his genus *Comaturella*, and described many new species belonging to known genera. M. Herm. de Meyer has also established two new genera of *Crinoideæ* in the '*Museum Senkenbergianum*' for 1837, under the names *Isocrinus* and *Chelocrinus*. M. Bronn has described the genus *Ctenocrinus* in the '*Jahrbuch für Mineral. u. Petref.*'

for 1840; M. Steininger that of *Halocrinites*, in the eighth and ninth volumes of the Bulletin of the Geological Society of France, and in the first volume of the Transactions of this Society. MM. Quenstedt (Wieg. Archiv, 1835) and Bronn (Jahrb. für Min. 1837) have described some new species of *Encrinus* from the muschelkalk; so that three species of this remarkable genus are now known.

Mr. Phillips, in the second part of his 'Geology of Yorkshire,' besides describing many new species belonging to known genera, has established two new genera of *Crinoideæ* from the coal-measures, to which he gives the names *Euryocrinus* and *Gilbertocrinus*. The same writer has moreover described a great number of new *Crinoideæ* belonging to the most ancient fossiliferous deposits, in the work of Mr. Murchison upon the Silurian system, among which we likewise find many new genera, which he calls *Marsupiocrinites*, *Hypanthocrinites*, and *Dimerocrinites*. The genus *Ischadites* of M. König (Murch. Sil. Sys., pl. 26, fig. 11) also belongs to the *Crinoideæ*; M. de Buch considers it to be identical with *Sphæronites aurantium*. Under the name *Scyphocrinites*, M. Zenker has described a peculiar form in this class, in his 'Naturgeschichte der Urwelt.' Lastly, M. de Hagenow has made known a new genus allied to *Solanocrinus*, which he names *Hertha*, and many new species of *Crinoideæ* and *Echinidæ*.

I shall allude again to the genera *Glenotremites* of Goldfuss and *Ganymeda* of Gray, because I have ascertained with certainty that they have been established upon crinoidal axes belonging to the family of the *Comatulæ*, and consequently they ought to be suppressed. As regards the genera *Caryocrinites*, Say, and *Trianisites*, Rafinesque, these are only known to me by name. The genus *Marsupites* of Mr. Mantell (*Marsupium*, König) is too well known to be mentioned as a recent acquisition to the science of palæontology.

M. Römer, in his work upon the Jurassic fossils of the north of Germany, and in his second work upon the cretaceous fossils of the same country, describes a considerable number of new species amongst the *Echinites* and *Crinoideæ*. MM. Koch and Dunker have described many new *Echinites* in the Supplement to the first work, and M. Hinsinger those of the formations in Sweden in his 'Lethæa Suecica,' accompanied with excellent figures.

The family of the *Crinoideæ* ought especially to engage the attention of naturalists, inasmuch as, from the great variety of forms which it contains, it will furnish the clue to the development of the entire class *Echinodermata*. These forms are

as it were the precursors of the *Comatulæ*, the *Asteriæ*, and the *Echinites*, the forms of which they have in some instances already appropriated. In this particular the most remarkable of all the genera is that which I shall describe under the name *Echinocrinus*, and which presents the perfectly spheroidal shape of the Sea-urchins, with the narrow *ambulacra* and long prickly spines of certain *Cidarites*. The analogy with these last is so striking, that detached fragments of this genus (which is only found in the coal-measures and transition formations) have already actually been described as fragments of *Cidarites*. Such for instance, among others, are the *Cidaris Urie* of Fleming, the *Cidarites Nerei*, *Protei* and *priscus* of Count Munster, and some other unpublished species.

But little is known at present of the fossil *Asteriæ* and *Ophiuræ*; a very small number only have been described, amongst which, as new species, I shall mention those which Mr. Williamson has published in Loudon's 'Magazine of Natural History' for 1836, and those from the collections of the Earl of Enniskillen and Sir Philip Egerton, described by Mr. Broderip in the fifth volume of the 'Transactions of the Geological Society of London,' without enumerating those which have been published by Count Munster, M. Goldfuss, M. Des Moulins and M. Agassiz. Their number however is very considerable, and I am glad to announce a work by Mr. Dixon which is to embrace all the British species.

M. Frédéric Dubois of Montpéreux, in the Atlas of his travels in the Crimea, &c., has commenced the publication of the magnificent collection of fossils brought by him from those countries by the issue of a large plate of highly interesting *Echinites*. In the fourth volume of the second series of the 'Memoirs of the Academy of Sciences of Turin,' De Sismonda has published a complete monograph of the fossil *Echinites* of Piedmont, in which he describes a new genus under the name *Anaster*, and a large number of new species accompanied with good figures. M. Grateloup has likewise published a special memoir upon the fossil Sea-urchins which occur in the calcareous formations in the environs of Dax (Actes de la Soc. Lin. de Bordeaux, tom. viii.). M. Leymerie has described many interesting species of the genus *Diadema* in the third vol. of the 'Geol. Trans. of France.' In the same work, vol. ii., M. Dujardin has also described a new Sea-urchin, from the chalk. M. de France has given, in the 'Dictionary of Natural Sciences' of Levrault, numerous articles on the various genera of fossil *Echinodermata*, which make us acquainted with the condition of the science upon this

subject at the period of the publication of this encyclopædia. Notwithstanding that it embraces these fossils in their totality, the great work of Goldfuss on the Petrifications of Germany will for a long time to come be a standard work for the study of fossil *Echinodermata*.

In the 'Nouveaux Mémoires de la Soc. Helvétique des Scien. Naturelles' (tom. ii. et iv.), I have made known the fossil *Echinites* of Switzerland; my descriptions are accompanied with figures which represent all the species under various aspects. In this memoir I have established the following genera:—*Hyboclypus*, *Pygorhynchus*, *Conoclypus*, *Pygurus*, *Hemicidaris*, *Acrocidaris*, *Acrosalenia*, *Tetragramma*, *Pedina*, and *Glypticus*. In the first volume of the 'Mém. de la Soc. des Sc. Nat. de Neuchâtel,' I had previously published, in part, a notice on the species of the Neocomian formations; since then, in my systematic catalogue of the casts of the fossil Sea-urchins in the museum at Neuchâtel*, I published the essential characters of the new or little known genera which I have established up to the present time amongst the *Echinites*. The following genera are there characterized for the first time:—*Toxaster*, *Brissopsis*, *Nucleopygus*, *Globator*, *Caratomus*, *Amblypygus*, *Ibeliophora*†, *Amphiope*, *Encope*, *Echinopsis*, *Cyphosoma*, *Acropeltis*, *Cælopleurus*, *Codiopsis*, *Podophora*, and *Acrocladia*. The distribution of many series of these casts has given a publicity to my researches upon the *Echinites*, which I hope will aid in advancing our knowledge of these fossils, and facilitate the identification of specimens which as yet may not be figured or even described. I have also put into circulation representations, as faithful as it was possible to obtain them, of a great number of unique specimens in a very perfect state of preservation.

Since the publication, in 1838, of my first monograph upon the *Echinodermata*, the materials at my disposal have been greatly augmented. A number of new species in all the orders of the class *Echinodermata* have been entrusted to me by the numerous friends of science, who have considered that a most efficacious way of serving it would be that of bringing together, in the same publication, the greatest possible amount of data. I therefore esteem it both a duty and pleasure to record here the names of all those who have acquired new claims to my gratitude, whether it be in the communication

* Catalogus System. Ectyporum Echinodermatum Fossilium Musei Neocomensis, 4to, 1840.

† This genus has since regained the name *Rotula*, given to it more than a century ago by Klein, but of which no one had taken notice.

of original specimens, or in furnishing me with information upon the distribution or location of species. * * *

[The length to which the list extends of British and Foreign Naturalists to whom Prof. Agassiz expresses his obligations, precludes our giving it insertion.—EDIT.]

Neuchâtel, July 1841.

XXXV.—*Descriptions of new species of Coleopterous Insects belonging to the Genus Apocyrtus, collected by Hugh Cuming, Esq., in the Philippine Islands.* By G. R. WATERHOUSE, Esq., Assistant Secretary and Curator to the Zoological Society.

Order COLEOPTERA.

Sect. CURCULIONIDES.

Div. PACHYRHYNCHIDES, Schö.

Genus APOCYRTUS, Erichson.

Apocyrtus Schænherri.

Ap. niger; capite notâ inter oculos et utrinque infra oculos; thorace notâ transversâ anticâ, maculisque duabus lateralibus et superioribus, necnon elytris maculis viginti-duabus, splendide cupreis, vel aureo-cupreis; rostro rugoso-punctato ad basin transversim impresso, capite et rostro canaliculo longitudinali impressis; thorace crebrè punctato; elytris globoso-ovatis ferè duplò thorace latioribus, distinctè punctatis, punctis in striis irregularibus dispositis. Long. corp. $8\frac{1}{2}$ lin.; lat. $3\frac{3}{8}$ lin.

This is the largest species of the genus I am acquainted with; its elytra are less globose, and the thorax is larger in proportion to the elytra than in *Ap. inflatus*: the beautiful metallic spots with which it is adorned vary somewhat in hue, being in some specimens of a reddish golden tint, and in others of a copper colour. The rostrum is thickly punctured, and the punctures are more or less confluent; a transverse indented line separates the rostrum from the head, and a longitudinal impression runs from this line towards the fore-part of the rostrum, becoming gradually broader in front and terminating in a line with the insertion of the antennæ. The head is rather sparingly punctured; between the eyes is a small metallic spot (in some specimens wanting), and beneath the eye is an oblique mark formed of brilliant scales. The thorax is very nearly equal in length and breadth, subglobose, and truncated before and behind; on the anterior margin is a transverse mark, about midway between the anterior and posterior margins; and towards the side of the thorax is a round spot, and just above the insertion of the femur is a broad oblong mark formed of brilliant scales; the surface of the thorax is rather coarsely punctured, and the punctures are many of them confluent. The elytra are more than one-third broader than the thorax—sometimes nearly twice as broad—about one-third broader than long, ovate and very convex; they are punctured, and the punctures